

Renewable geothermal energy

Geothermal is a lesser-known type of renewable energy that uses heat from the Earth's molten core to produce electricity.

While this unique feature gives it key benefits over solar and wind, it also suffers from high costs and geographic restrictions. Because of this, few countries have managed to produce geothermal energy at scale.

In this infographic, we've used a combination of diagrams and charts to give you a high level overview of this sustainable energy source.

Geothermal energy is produced by accessing reservoirs of hot water that are found several miles below the earth's surface. In certain parts of the planet, this water naturally breaks through the surface, creating what's known as a hot spring (or in some cases, a geyser).

When accessed via a well, this pressurized water rises up and rapidly expands into steam. That steam is used to spin a turbine, which then drives an electric generator.

Further along the process, excess steam is condensed back into water as it passes through a cooling tower. An injection well pumps this water back into the Earth to ensure sustainability.

As of 2021, global geothermal power generation amounted to 16 gigawatts (GW). Only a handful of countries have surpassed the 1GW milestone.

To give these numbers context, consider the following datapoints:

While geothermal plants clearly produce less power, they do have benefits over other types of renewables. For example, geothermal energy is not impacted by day-night cycles, weather conditions, or seasons.

We now look at a second dataset, which shows the global contribution of each type of renewable energy. These figures are as of April 2022, and were sourced from the International Renewable Energy Agency (IRENA).

One reason for the slow adoption of geothermal energy is that they can only be built in regions that have suitable geological features (such as places where there is volcanic activity).

To expand on that point, consider the following data from Fitch Solutions, which shows the forecasted growth of geothermal energy capacity by region.



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